The Chrysler/DOE Hybrid Propulsion Systems Development Program

Chrysler Corporation has a strong history of demonstrating its automotive manufacturing and assembly capabilities in bringing innovative vehicles to the marketplace. In early 1996 Chrysler Corporation and the U.S. Department of Energy (DOE) signed a cost-shared $85 million contract to develop a production-feasible hybrid propulsion system that improves fuel economy, reduces emissions, and meets the needs of consumers. The program is broken into four phases over a period of four years:

- *Concept Definition (Phase A).* This phase includes the test and evaluation of existing hybrid systems, assessment of current technology and suppliers, and the development of specifications for powertrain components and subsystems.
- *Design and Development (Phase B).* Chrysler will focus on the design and development of Generation 1 components and integration of the propulsion system into a testbed vehicle. Generation 1 analyses will be used to determine Generation 2 specifications.
- *Vehicle Integration (Phase C).* The first version of the Generation 2 hardware will be developed and integrated into a test vehicle. Generation 2 test results will be used to refine the specifications for the final components.
- *Vehicle Demonstration (Phase D).* Chrysler will integrate and test the refined Generation 2 hardware in a prototype vehicle.

The Chrysler contract integrates industry/government teamwork, technology advancements, and a customer focus to develop and produce efficient hybrid propulsion components that meet cost, quality, and performance goals. The main targets of the contracted effort include:

- Doubling fuel efficiency
- Tier II emissions compliance
- System costs comparable to today's powertrain costs
- Component manufacturability
- Features and performance that are comparable to a conventional five-passenger vehicle
- Reducing development time and resources by utilizing modeling, simulation, and novel component packaging
- Investigating domestic alternative fuel use

The technical scope of this contract includes propulsion hardware and software development, system integration, and testing. Chrysler will focus its technical development efforts on electric motors, controllers, flywheels, gas turbine and compression ignition engine systems, and several technology evaluation vehicles.

Chrysler believes that both the series and parallel hybrid operating strategies have the potential to meet the program goals; therefore, both strategies will be evaluated. The parallel vehicle will use a four-stroke direct injection engine as the

prime mover, while the series vehicle will use a gas turbine alternator to deliver power to the hybrid power controller which will regulate the power flow between the electric motor and the energy storage device.

Team members include:

AlliedSignal	turbines
SatCon Technology Corporation	motor controller, power electronics
Detroit Diesel	diesel engine
Bolder Battery	battery
New Venture Gear	transcaxle
TRW	steering
Allied Signal	brakes

Team members may change over time as the needs of the effort evolve.

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